

Evaluation of the effectiveness of physical exercises using the action of infrared rays

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Abstract

Introduction. Infrared radiation is invisible electromagnetic radiation with a wavelength of 000 nm 770-15. There are many scientific reports, which confirm the positive effect of the therapy waves with a range of red and infrared light both on animals and patients in vivo. Infrared radiation is also used in devices VACU, which are joining the capsule effects of exercise and physical activity infra-red rays. With this combination practitioner achieve extraordinary effectiveness of the therapy.

Objective of the work. The aim of this study was to evaluate the effectiveness of training carried out in the capsule Vacu Fit to change the selected anthropometric parameters and body composition parameters.

Material and methods. The study was a 27-year old woman, whose age was determined on the metabolic 41 years. During the study of subjective patient he admitted that sports activities practiced occasionally, drinks very little and eats properly. The patient reported the onset of cellulite, stretch marks and excess body fat on the thighs, buttocks and stomach. By joining the training, its aim was to reduce reported problems.

Results. After the end of treatment in the majority of parameters assessed changes were observed.

Conclusions. A series of trainings conducted in a capsule Vacu alters the anthropometric parameters and body composition.

Key words: *infrared rays, physical exercises, Vacu Fit*

Introduction

Nowadays physiotherapy clinics are equipped with many devices that use different types of physical methods. Among the most common are devices that emit mechanical, magnetic or electromagnetic. The latter include waves in the range of visible light of red and infrared energy [1]. Infrared radiation (infra-red "IR"). It is invisible electromagnetic radiation with a wavelength of 000 nm 770-15. Human skin absorbs 70% of the remainder of this radiation is reflected by it. 3 distinguishes infrared radiation types: short-wave IR-A, IR-B medium term and long-term C IR [2]. They differ in the depth of penetration in the body. Short-wave radiation penetrates deeply IR A because reaches up to 30 mm into the tissue. The essence of infrared radiation to heat, which causes:

- extension of the skin capillaries;
- streamlining the flow of blood through the tissues, and the better nutrition;
- reduction of muscle tone by affecting the autonomic nervous system;
- an analgesic effect by raising the pain threshold;
- acceleration of metabolism;
- increased sweating [3].

After the procedure, there is reaction, which can be local or general, which affects the whole body. Local reaction arises only tissue for which the procedure was performed directly or also on the adjacent tissue. This is due to expansion of the blood vessels of the skin and thus the appearance of redness. This type of reaction is termed erythema heat, which is mainly characterized by non-uniform edges and rapid decay time after the procedure [4].

There are many scientific reports, which confirm the positive effect of the therapy waves with a range of red and infrared light both on animals and patients in vivo. Positive effects of light therapy is used, inter alia, dermatology, neurology, orthopedics and dentistry. Light therapy makes the body produced reactive oxygen species known as RFT. They provide a signal that stimulates many biological processes, among other things:

- normalization redox reaction;
- stimulation of hematopoiesis
- normalization of the functioning of the pro- and antioxidant systems
- normalization process wapniozależnych
- immunomodulatory effects
- neuromodulator [5]

The effect of the treatment with the use of light therapy depends primarily on the degree of absorption of the light used. Absorption coefficient in turn is dependent on the wavelength and the dosage used. Contrary to appearances, it is the low-dose initiate changes in blood components, and even in the same cells. Biological processes initiated as a result of such procedures persist for many hours and even days. As a result, light therapy greatly affects the body and its effects persist for a long period of time [6].

Infrared radiation is also used in devices VACU, which are joining the capsule effects of exercise and physical activity infra-red rays. With this combination practitioner achieve extraordinary effectiveness of the therapy. Infrared causes rapid burning calories at the same time eliminating cellulite and firming the body. Using prozdrowotnie treatments work not only on the skin, but also helps weight loss. During exercise, there is an increase in blood flow in the skin and subcutaneous tissue, and increase the production of substrates from adipose tissue. As a result, there is a faster transport them into muscle tissue, where as a result of oxidation processes in the mitochondria produces carbon dioxide and water. Classes in the capsule causes improving lymphatic circulation, which accelerates the removal of excess fluids and metabolic waste products from the body. With exercise comes to smooth the skin,

improving the firmness and reduction of circuits: the thighs, hips, waist and abdomen. An additional benefit of training is pleasant feeling spill heat in the body as a result of deep inference wave [7,8].

Among the expected effects of training are mentioned:

- removing cellulite;
- increase in metabolic rate;
- acceleration of blood circulation in the skin and subcutaneous tissue, which results in double the rate of metabolism which provides a rapid loss of excess weight;
- slimming and body contouring;
- to improve the physical condition;
- improved blood circulation and improve the work of the lymphatic system;
- removing toxins and waste products from the body;
- release of hormones of happiness during training;
- improve the functioning of the cardiovascular system - increased heart rate;
- analgesic - an analgesic in the treatment of injury, and chronic pain of neurological origin and rheumatoid [9].

In order to achieve permanent and visible results it is recommended that 10 to 20 training sessions. The treatments are held in a secure the body temperature of 60 degrees Celsius. To training has been successfully completed training should consist of three phases (Fig. 1):

- Stage I - the first five minutes - to adapt the body to the surrounding temperature
- Stage II - another 20 minutes - at a rate of active exercise walking or running
- Stage III - last 5 minutes - re-transition to the normal



Drawing 1. Changes in the body at different stages of training
[Source: <http://tytanfit.pl/vacu-fit>]

Training in the capsule to be safe treatments. It is important, however, to follow a few rules. Eat a meal 1.5 hours prior to surgery. During surgery, drink water 0.5 l. In order to supplement the loss of electrolytes after surgery it is recommended to drink an isotonic drink. Among the contraindications to exercise in Vacu Fit capsules include:

- heart disease and cardiovascular
- diabetes
- epilepsy
- pregnancy
- period
- hypertension, varicose veins, diseases of the joints (after consultation with your doctor)
- hernia
- unhealed scars after surgical operations
- Hormonal stimulation for becoming pregnant
- Individual medical contraindications to physical exercise
- thrombotic acute pain
- neoplasms and tumors
- Hypothyroidism
- severe migraine headaches
- implanted metal parts
- dissection of the cornea
- knee and hip prosthesis
- a heart pacemaker [10]

Objective of the study

The aim of this study was to evaluate the effectiveness of training carried out in the capsule Vacu Fit to change the selected anthropometric parameters and body composition parameters.

Material and method

The study was a 27-year old woman, whose age was determined on the metabolic 41 years. During the study of subjective patient he admitted that sports activities practiced occasionally, drinks very little and eats properly. The patient reported the onset of cellulite, stretch marks and excess body fat on the thighs, buttocks and stomach. By joining the training, its aim was to reduce reported problems.

After qualifying test patient for an objective assessment of the effectiveness of the training is used anthropometric measurements were performed using a measuring tape. The measurements were performed three times: before the first training, after training and 5 after the completion of a series of 10 training. Were evaluated for variations in:

- hip circumference
- waist circumference
- thigh circumference
- right arm circumference

In addition, a body composition analyzer Tanita also evaluated three times body weight, BMI, body fat and muscle, resting metabolism, hydration and bone mineral mass.

The woman was subjected to 10 workouts in the capsule Vacu Fit, which lasted 30 minutes each and take place from Monday to Friday at the same time of day. Training took place in accordance with the guidelines contained in the manual device in three phases. The first phase lasted 5 min and was tasked to prepare the body to change. The second phase was

a main phase, wherein the patient was designed to run. The third phase was a final phase, it was to cause a slow transition to the normal conditions of the organism.

Results

Analysis of the results was made in a spreadsheet EXCEL. The results are shown in Table 1 and Table 2.

After completion of a series of training observed reduction circuit 5 cm hips. There was no decrease while within the waist. Thigh circumference decreased by 6 cm with respect to the initial value. In contrast, the arms 2 cm (tab. 1).

Table 1 Changes in the body during training circuits

Parameter	Before the series of workouts	After training	5 After training	10
Hips [cm]	112	110	107	
Waist circumference [cm]	72	72	72	
Thigh [cm]	67	64	61	
Arm circumference [cm]	31	thirty	29	

Body composition analysis after the completion of the trial showed that body weight was reduced by 0.4 kg. BMI was reduced by 0.2 kg / m². Body fat was reduced by 1.8%, while the weights of muscle has increased by 0.9 kg. It is important that hydration increased by up to 1.3%. The body's resting metabolism increased by 20 kcal. The ground bone mineral did not change (Table 2).

Table 2. Changes in body composition during training

Parameter	Before the series of workouts	After training	5 After training	10
Body weight [kg]	68.0	68.4	67.6	
BMI [kg / m ²]	24.1	24.2	23.9	
Fat tissue [%]	36.5	34.9	34.7	
Muscle tissue [kg]	41	42.3	41.9	
Hydration [%]	47.2	48.4	48.5	
Resting metabolism [kcal]	1358	1390	1378	
Bone mineral mass [kg]	2.2	2.3	2.2	

Discussion

In the available literature there are no objective scientific reports that confirm the effectiveness of the training in capsules that emit infrared radiation. The positive effects of this type of training on the body indicate only the opinions of those who participated in this type of training programs.

However, there are scientific reports that confirm the positive impact of the action of infrared radiation on the body. Marcinkowska-Gapińska and Nawrocka-Bogusz [11] in his article on the impact of the magnetic field and infrared light on the rheological properties have shown the positive impact of such procedures on the body. After examination of a blood sample 14 has been demonstrated that magnetic field and the infrared light effect on reducing the viscosity of the blood and plasma as well as the ability to cause erythrocytes to deformation and aggregation. As a result, blood flow in the blood vessels improves.

Chojnowski et al. [12] examined the effect of overheating in turn systemic body in the infrared sauna. Evaluated how such treatments affect the daily glycemic profile in patients with type 2 diabetes. The study enrolled 30 people. Subjects received 1 treatment in the sauna IR at a temperature of 56-65°C, the duration of the treatment 20 minutes. The day before the surgery, and the treatment was performed on 5-point glucose profile. (H. 800, 1000, 1200, 1500, 1800 and 2200). Furthermore, both before surgery and after surgery were studied

studied blood pressure and heart rate. The results were subjected to statistical analysis. There were no significant differences between the glucose values on the treatment and without surgery. Stated in turn that Infrared treatments overheating effect on blood pressure reduction in systolic and diastolic blood pressure and increase heart rate immediately after surgery in patients with type 2 diabetes.

Conclusions

1. A series of trainings conducted in a capsule Vacu alters the body anthropometric parameters
2. A series of trainings conducted in a capsule Vacu alters the body composition parameters
3. Training with the use of infrared radiation appears to be an effective method in the treatment of those seeking to improve their physique. Therefore, it seems necessary to continue research and to conduct them on a larger number of people, as well as the creation of the control group and comparative.

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